

# **STORM WATER MONITORING GUIDANCE MANUAL for Industrial Activities**



**ARIZONA DEPARTMENT OF TRANSPORTATION**

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### ***Disclaimer***

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## 1.0 INTRODUCTION

To limit pollutants in storm water discharges from industrial facilities, the National Pollutant Discharge Elimination System (NPDES) Phase I storm water program includes an industrial storm water permitting component. Operators of industrial facilities included in one of the 11 categories of “storm water discharges associated with industrial activity” (40 CFR Part 122.26 (b)(14)(i)-(xi)) that discharge storm water to a Municipal Separate Storm Sewer System (MS4) or directly to waters of the United States require authorization under a NPDES industrial storm water permit. The Multi-Sector General Permit (MSGP) was the first general permit to provide facility-specific requirements for several types of industrial facilities within one permit. The permit presents all requirements up front, allowing facility operators to become familiar with, and prepare for activities such as Storm Water Pollution Prevention Plan (SWPPP) preparation and monitoring prior to applying for permit coverage. The MSGP-2000, which was published in the Federal Register on October 30, 2000, replaced the original MSGP that the Environmental Protection Agency (EPA) issued on September 29, 1995. Like the MSGP-1995, the MSGP-2000 contains general permit requirements (i.e., requirements that pertain to all sectors) and sector-specific requirements (i.e., requirements applicable only to facilities within each of the industrial sectors). Most industrial sectors have non-storm water discharge characterization, visual, analytical, and/or compliance monitoring requirements.

Currently, industrial storm water in Arizona is permitted under the MSGP-2000. However, the Arizona Department of Environmental Quality (ADEQ) has prepared a draft AZMSGP that will replace the federal MSGP-2000. Should ADEQ finish and issue the AZMSGP before EPA issues the new MSGP-2005 in October 2005, storm water permitting in Arizona (except on tribal lands) will be regulated under the AZMSGP. If ADEQ is unable to finish and issue the AZMSGP before October 2005, storm water permitting in Arizona will be regulated under the new MSGP-2005.

***IMPORTANT NOTE: This manual was written to conform to the requirements of the MSGP-2000 since the AZMSGP has not yet been issued by ADEQ. It should be noted that the draft AZMSGP has significantly different requirements than the current MSGP-2000. If ADEQ issues the AZMSGP before October 2005, this manual will be rewritten to conform to the AZMSGP requirements. If the AZMSGP is not issued before October 2005, this manual will be updated to conform to the new MSGP-2005 requirements.***

If an industrial facility has a Standard Industrial Classification (SIC) Code or meets the narrative description listed in one of 11 industrial categories, the facility operator must determine if the facility is eligible for coverage under the MSGP-2000 or an individual NPDES industrial storm water permit. In some cases, a facility operator may be eligible for a conditional exclusion from permitting requirements, known as the No-Exposure Certification. The No-Exposure Certification exempts the facility from coverage under the NPDES permit system if the facility’s industrial materials and operations are not exposed to storm water.

The Arizona Department of Transportation (ADOT) has currently identified activities within three industrial sectors, which are eligible for coverage under the MSGP-2000 and will require monitoring (Table 1): Sector J - Mineral Mining and Dressing, Sector S - Air Transportation Facilities, and Sector AA - Fabricated Metal Products. Sector J applies to all ADOT-owned or operated Material Source

Mining Sites. Sector S is applicable to the Grand Canyon Airport. Sector AA applies to the ADOT Traffic Operations Sign Factory. A fourth industrial facility, the ADOT Print Shop (Sector X) has applied for a No-Exposure Exemption. These facilities will either require completion of facility-specific Notices of Intent (NOI), SWPPPs, and monitoring or filing of a No-Exposure Certification.

**Table 1.**ADOT Industrial Facilities with Monitoring Requirements

<b>MSGP Sector</b>	<b>Industry Sub-Sector</b>	<b>ADOT Facility</b>
<b>J</b> Mineral Mining and Dressing	Dimension stone, crushed stone, and non-metallic minerals (except fuels)	ADOT-Owned or Operated Material Source Mining Sites
	Sand and gravel mining	
<b>S</b> Air Transportation Facilities	Airports with de-icing activities	Grand Canyon Airport
<b>AA</b> Fabricated Metal Products	Fabricated metal products except coating	ADOT Traffic Operations Sign Factory
	Fabricated metal coating and engraving	

## 1.1 Purpose of This Document

This manual will assist ADOT facilities subject to monitoring and reporting requirements under the MSGP-2000 in complying with their monitoring requirements, and ensure proper reporting of monitoring results. This manual identifies the following:

- The ADOT industrial activities required to report storm water discharge monitoring results under the MSGP-2000
- The parameters to be monitored
- When to monitor
- How to monitor
- Documentation requirements
- Instructions on how to record monitoring results on a Discharge Monitoring Report (DMR)
- When and where to report monitoring results
- How to interpret the monitoring results

It should be noted that this document is intended to be used solely as guidance to clarify the reporting terms and conditions of the permit. Please consult the MSGP-2000 permit for official requirements.

## **2.0 OVERVIEW OF MONITORING REQUIREMENTS**

This section presents an overview of the types of monitoring required by the MSGP-2000. Specific monitoring requirements for ADOT facilities may be found in Sections 3, 4, and 5 of this manual. Sampling, data management, and reporting considerations for all facilities may be found in Sections 6, 7, 8, and 9 of this manual.

The MSGP-2000 requires operators of ADOT industrial facilities to perform as many as four types of monitoring of their storm water outfalls: non-storm water discharge characterization evaluations, visual examinations, analytical monitoring, and compliance monitoring. The types of monitoring required vary among ADOT facilities. ADOT facilities that have discharges subject to analytical monitoring and/or compliance monitoring must report their results to ADEQ.

### **Permit Coverage for ADOT-Owned or Operated Material Source Mining Sites:**

The MSGP-2000 identifies three phases of a mining operation: Exploration and Construction Phase; Active Phase; and Reclamation Phase. It is important to note that coverage under the MSGP-2000 begins at the Active Phase and covers through the Reclamation Phase. Clearing, grading, and excavation activities being conducted as part of the Exploration and Construction Phase of an ADOT-owned or operated materials source mining site cannot be covered under the MSGP-2000 if these activities will disturb one or more acre of land. Instead, coverage for these activities must be under the latest version of *Arizona Pollutant Discharge Elimination System General Permit for Discharge from Construction Activities to Waters of the United States, Permit No. AZG2003-001* and follow the guidelines in the *ADOT Erosion and Pollution Control Manual* and the *Storm Water Monitoring Guidance Manual for Construction Activities* (discharges to unique, impaired, and not attaining waters only). If the area of disturbance during the Exploration and Construction phase is less than one acre, ADOT-owned or operated materials source mining sites must comply with the requirements of the MSGP-2000 at the initiation of the active mining phase. If active mining operations will ensue, ADOT-owned or operated materials source mining sites must apply for coverage under the MSGP-2000 for storm water discharges and comply with the requirements of the MSGP-2000 prior to beginning the active phase.

## **2.1 Non-Storm Water Monitoring**

### **2.1.1 Non-Storm Water Discharge Characterization**

Under the MSGP-2000, all discharges (outfalls) from the ADOT Traffic Operation Sign Factory, all ADOT-owned or operated materials source mining sites, and the Grand Canyon Airport must be tested or evaluated for the presence of non-storm water and certified to be free from non-storm water discharges. The outfalls to be evaluated are identified in each facility's SWPPP. Non-storm water initial discharge characterization certifications need to be performed only once for each outfall at the above ADOT facilities.

Non-storm water discharge characterization certifications must initially be performed within 180 days of filing a NOI to discharge under the MSGP-2000 and documented in the SWPPP certification. Non-storm water discharge characterization evaluations may be performed at any time of the year. A copy of the initial certification will be included in the facility's SWPPP and kept onsite.

## **2.1.2 Inability to Meet Non-Storm Water Discharge Characterization Requirements**

If certification of non-storm water discharge characterization is not possible, ADEQ must be notified within 180 days after the NOI has been filed. The reason(s) for not performing the certification and all potential sources of non-storm water discharges must be documented in the ADEQ notification. A copy of the notification must be included in the SWPPP and kept onsite.

## **2.2 Storm Water Monitoring**

### **2.2.1 Qualifying Rainfall Event**

Visual examinations and analytical monitoring for storm water compliance purposes must be completed during a discharge that occurs as a result of a qualifying rainfall event. For purposes of the MSGP-2000, a qualifying rainfall event is defined as a rainstorm that:

- Produces 0.1 inch or more in measured rainfall
- Causes runoff to be present at the outfall
- Occurs at least 72 hours from the previous 0.1-inch rainfall

Because the rainfall depth of 0.1 inch is a condition of the MSGP-2000, conducting visual examinations and analytical monitoring without evaluating the strength of a storm beforehand could waste considerable effort. The chances of meeting the criterion for rainfall at a minimum of effort increase if weather forecasts are evaluated before deciding whether or not to sample a particular rainfall event.

Keeping up with the weather forecast and planning so that visual examinations and analytical monitoring can be carried out on short notice are the keys to successful sampling. Local forecasts, including televised satellite and radar images, can give an indication of the expected intensity of coming storms. The National Weather Service is an excellent source of information on upcoming storms. It also includes local current radar and satellite images. Their website is <http://www.wrh.noaa.gov>. A number of commercial websites, such as <http://www.weather.com> and [Yahoo.com](http://www.yahoo.com) also provide weather information and forecasts.

When evaluating a weather forecast, consider indications of expected rainfall amounts. For example, “90% chance” rather than “50% chance” and “rain” rather than “showers”. Over the telephone, National Weather Service personnel can often provide estimates of anticipated rainfall amounts. In addition, consider the predicted duration of the storm. It will be helpful to spend time observing rainfall events at the ADOT facility with close attention to how different rainfall depths relate to storm-water discharges from the facility before sampling.

Once the decision has been made to attempt to sample a rainfall event, the monitoring personnel should be notified and they should prepare to sample. If it does rain, they should be at the monitoring points before storm water begins discharging so they can document the time of discharge and be ready to perform visual examinations and analytical monitoring.

Every ADOT facility is required maintain a rain gauge on site. Monitoring personnel will be responsible for maintaining the rain gauge; preparing the gauge for rainfall events, recording rainfall amounts, and cleaning the gauge after rainfall events.

### 2.2.2 Visual Examination Requirements

All facilities covered by the MSGP-2000 are required to perform visual examinations of their storm water discharges (Table 2). Visual examinations provide a simple and inexpensive means of obtaining a rough assessment of storm water quality. Each examination is to be performed during daylight hours in a well lit area by monitoring personnel, who must examine a sample collected in the first half hour of discharge resulting from a qualifying rainfall event (or as soon thereafter as practical, but not to exceed one hour) and note any color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and any other indicators of possible storm water pollution. Visual examinations must be performed on a quarterly basis over the entire permit term.

**Table 2. Visual Examination and Analytical Monitoring Requirements for ADOT Facilities**

<b>MSGP Sector</b>	<b>Industry Sub-sector</b>	<b>ADOT Facilities</b>	<b>Visual Monitoring Required?</b>	<b>Required Benchmark Parameters for Analytical Monitoring</b>	<b>Required Parameters for Compliance Monitoring</b>
<b>J Mineral Mining and Dressing</b>	Dimension stone (SIC Code 1411), and non-metallic minerals (except fuels [SIC Code 1499])	ADOT-owned or operated cinder pit, stone quarry, and borrow pit material source mining sites	YES	TSS	None
	Sand and gravel mining (SIC Codes 1442 and 1446)	ADOT-owned or operated sand and gravel material source mining sites	YES	NO <sub>2</sub> + NO <sub>3</sub> , TSS	pH, TSS (for dewatering activities only)
	Crushed Stone (SIC Codes 1422 and 1429)	ADOT-owned or operated sand and gravel material source mining sites	YES	TSS	pH, TSS (for dewatering activities)
<b>S Air Transportation Facilities</b>	Airports with de-icing activities	Grand Canyon Airport	YES	None	None

AA Fabricated Metal Products	Fabricated metal products except coating	ADOT Traffic Operations Sign Factory	YES	Aluminum, iron, zinc, NO <sub>2</sub> + NO <sub>3</sub>	None
	Fabricated metal coating and engraving				

### 2.2.3 Analytical Monitoring Requirements

Analytical monitoring is required only for the industry sectors or sub-sectors that were determined to have a high potential to discharge a pollutant at concentrations of concern. It provides feedback to the facility operator to assess the effectiveness of the facility's SWPPP. Table 2 identifies the ADOT facilities that are required to perform analytical monitoring of their storm water discharges. Analytical monitoring must be performed on a quarterly basis in years two and four of the MSGP-2000 (2006 and 2008). Visual examinations and analytical monitoring may be conducted during the same qualifying rainfall event.

### 2.2.4 Representative Discharge

When a facility has two or more outfalls that discharge substantially identical effluents, monitoring personnel may examine a sample from one of such outfalls and report that the examination data applies to the substantially identical effluent. The monitoring personnel must document their rationale for this in the facility's SWPPP, including consideration of industrial activity, significant materials, and management practices in the drainage areas that flow to the respective outfalls. Page 107 of the *NPDES Storm Water Sampling Guidance Document* (EPA 833/B-92-001) lists the criteria for substantially identical outfalls.

### 2.2.5 Sampling Waivers for Visual Examination Requirements

The MSGP-2000 allows for waivers from visual examination requirements under two circumstances: adverse weather conditions, and unstaffed and inactive sites.

#### Adverse Weather Conditions

When a discharger is unable to collect samples for visual examination over the course of the visual examination quarter as a result of adverse climatic conditions, the reason for not performing the visual examination must be documented and retained onsite with the SWPPP. Adverse weather conditions that may prohibit the collection of samples for visual examination include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricanes, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

#### Unstaffed and Inactive Sites

If a facility with discharges subject to visual examination requirements is both unstaffed and inactive, the discharger may exercise a waiver of the visual examination requirement as long as the facility remains unstaffed and inactive. The facility must maintain a certification with the SWPPP stating that the site is unstaffed and inactive and that performing visual examinations during a qualifying rainfall event is not feasible.

## **2.2.6 Sampling Waivers for Analytical Monitoring Requirements**

The MSGP-2000 allows for waivers from analytical monitoring requirements under two circumstances: adverse weather conditions, and unstaffed and inactive sites.

### Adverse Weather Conditions

The MSGP-2000 allows for temporary waivers from analytical monitoring based on adverse climatic conditions. If samples cannot be collected within a specified monitoring quarter due to insurmountable weather conditions such as drought or dangerous conditions (e.g., lightning, flash flooding, or hurricanes), the discharger must collect a substitute sample from a separate qualifying rainfall event in the next monitoring quarter. This substitute sample must be taken in addition to the routine monitoring required in that quarter. Both samples should be analyzed separately.

### Unstaffed and Inactive Sites

If a facility with discharges subject to analytical monitoring requirements is both unstaffed and inactive, and the ability to conduct sampling within permit specifications is not possible, then the discharger must certify in the Discharge Monitoring Report that the facility is unstaffed and inactive and that the ability to conduct sampling within the specifications is not possible.

## **2.2.7 When the Sampled Storm Does Not Meet Criteria**

There may be times when sampling has commenced but the rainfall stops and the rainfall intensity does not meet the criterion of the MSGP-2000. When this happens it may be best to dispose of the samples to save unnecessary lab expenses and to sample again during another qualifying rainfall event.

If, despite best efforts, it is not possible to collect samples during the first hour of a rainfall event (or as soon thereafter as practical, but not to exceed one hour) that meets the criteria for preceding dry conditions and rainfall intensity, the MSGP-2000 states that the facility may submit the sample results but must include an explanation with the DMR identifying what criteria were not met and why.

## **2.3 Compliance Monitoring**

### **2.3.1 Compliance Monitoring Requirements**

In addition to visual examinations and analytical monitoring, ADOT-owned and operated cinder pit (SIC Code 1429), stone quarry (SIC Codes 1422 or 1429), and sand and gravel material source mining sites (SIC Codes 1442 and 1446) are required to perform compliance monitoring on dewatering discharges composed entirely of storm water or ground water seepage. Table 2 lists the additional compliance monitoring parameters for these facilities. Compliance monitoring must be performed on an annual basis over the entire permit term.

### **3.0 ADOT TRAFFIC OPERATIONS SIGN FACTORY – SECTOR AA**

#### **3.1 Non-Storm Water Discharge Characterization**

##### **3.1.1 Non-Storm Water Discharge Characterization Certification Schedule**

Non-storm water discharge characterization certification is a one-time event to evaluate non-storm water discharges from the ADOT Traffic Operations Sign Factory (herein referred to as the Sign Factory). Non-storm water discharge characterization certifications need to be performed only once for each outfall as determined in the Sign Factory SWPPP.

Non-storm water discharge characterization certification must initially be performed within 180 days of filing an NOI to discharge under the MSGP-2000 and documented in the SWPPP certification. Non-storm water discharge characterization evaluations may be performed at any time of the year. A copy of the initial certification will be included in the facility's SWPPP and kept onsite.

##### **3.1.2 Non-Storm Water Discharge Characterization Evaluation Methods**

Non-storm water discharge characterization evaluations may be performed by utilizing these methods:

- Visual observation for discharges during periods of dry weather
- Visual observation for discharges originating from non-storm water sources such as pipes, drains, tanks, buildings, equipment, etc.
- Visual observation for unusual staining along drainage paths
- Visual observation of storm water runoff for the presence of abnormal color, solid, foam, or oily sheen
- Observation of unusual odors in storm water runoff

Once a potential non-storm water discharge has been identified, the following actions can be used to help identify the source:

- Physically trace the non-storm water discharge back to its source
- Utilize smoke or dye testing to locate the source of the non-storm water discharge in pipes
- Review storm sewer, sanitary sewer, plumbing schematics, and facility as-built plans
- Collect non-storm water discharge samples for laboratory analysis if the nature of the non-storm water discharge cannot be determined otherwise

##### **3.1.3 Non-Storm Water Discharge Characterization Documentation**

The following information shall be recorded on a Non-Storm Water Discharge Certification form (Appendix A):

- Facility name
- Date of testing or evaluation
- Name of person who conducted testing or evaluation
- Identification of potential significant sources of non-storm water on site
- List of outfalls observed during testing or evaluation

- Description of testing methods or evaluation criteria
- Description of results of any testing or evaluation of discharge

Entries on the Non-Storm Water Discharge Certification form should be made with waterproof ink. If an error is made, cross it out rather than whitening out or erasing.

If certification of non-storm water discharges cannot be made within 180 days after submitting an NOI, ADOT must submit to ADEQ notification of failure to certify. If the failure to certify is caused by the inability of ADOT to perform adequate tests or evaluations, the notification must include:

- Reason(s) why certification was not possible
- The procedure of any test attempted
- The results of such test or other relevant observations
- Potential sources of non-storm water discharges to the storm sewer

### **3.2 Monitoring Point Locations**

All storm water outfalls at the Sign Factory are identified in the facility's SWPPP. Monitoring points will be located at selected Sign Factory outfalls. (As previously described in section 2.2.3, Representative Discharge, if the Sign Factory has two or more outfalls that discharge substantially identical effluents, a single visual examination and analytical monitoring sample from one of the outfalls is sufficient as long as the collected monitoring data is representative of all outfalls.)

It is important that the selected monitoring points will provide samples that contain only the storm water that comes from the Sign Factory. If the storm water discharge to be sampled contains a discharge from other sources, move the monitoring point upstream to a point where the discharge is wholly from the Sign Factory. Also, verify that there is no base flow during dry periods. The SWPPP should identify the presence of any base flow and provide a specific measurement or an estimate of the flow rate. If it is not possible to collect a sample that contains discharge only from the Sign Factory, document the reason for this and provide detailed information concerning the source(s) of the discharge that is being sampled.

Potential Monitoring Points may include:

- Storm water runoff that enters the dry wells at the Sign Factory
- Pipes discharging the Sign Factory storm water offsite
- Ditches carrying the Sign Factory storm water offsite
- Manhole access points to storm sewers carrying the Sign Factory storm water, so a sample bottle attached to a pole can be lowered into the manhole (Manhole access on ADOT property may be simpler and safer than manhole access off ADOT property and will be more readily verifiable as carrying only the Sign Factory storm water)

These four types of monitoring points are not too difficult to access and the discharge within them tends to be fast enough, with enough turbulence, to allow for the collection of well mixed, representative samples.

Examples of situations in which you *should not* sample:

- A ditch that carries additional storm-water from properties upstream. In this case, the storm water from the Sign Factory is mixed with other water. Find a location or locations where the Sign Factory storm water alone can be sampled.
- Shallow sheet flow which is more difficult to sample. Find a location where the flow is deeper and can accommodate a sample bottle.
- A storm water sewer or pipe (culvert) discharges to a creek or other surface receiving water, and the pipe is partially submerged where it discharges into the receiving water. In this case, this final discharge point will not be able to be used as a monitoring point because the storm water discharge is mixed with the surface receiving water. Keep in mind that changing flow conditions in surface receiving waters, including flood stages, may occur during storm events.
- A manhole that carries storm water, not only from the Sign Factory but also from other storm water sources as well. If collecting a sample from a manhole but from the point where a storm sewer from the Sign Factory ends at a municipal manhole, make sure that the discharge in that pipe is entirely from the Sign Factory, that the pipe is not submerged or partly submerged, and that collecting storm water from the Sign Factory only is otherwise not prevented. If unsure that a storm sewer carries only discharge from the Sign Factory, the City of Phoenix may have storm sewer plans to help make this determination. Contact the City of Phoenix beforehand to discuss sampling from the manhole and associated safety issues, particularly for manholes in areas with vehicular traffic.

It is a good idea to observe the monitoring point(s) that have been chosen at the Sign Factory during actual storm water runoff conditions to see how readily storm water can be sampled.

### **3.3 Visual Examinations**

#### **3.3.1 Visual Examination Schedule**

The schedule for performing visual examinations must be clearly documented in the Sign Factory's SWPPP. Visual examinations are required to be performed on a quarterly basis throughout the period of permit coverage. At the Sign Factory, at least one visual examination must be performed during each of the following quarters:

1. October through December
2. January through March
3. April through June
4. July through September

Visual examinations will be conducted on discharges resulting from a qualifying rainfall event (an event that produces 0.1 inch or more in measured rainfall; causes runoff to be present at the outfall; and occurs at least 72 hours from the previous 0.1-inch rainfall).

Grab samples for visual examination must be taken in the first 30 minutes of the discharge produced by a qualifying rainfall event. If the collection of a grab sample during the first 30 minutes is impracticable, a grab sample can be taken during the first hour of the discharge, as long as an

explanation of why a grab sample during the first 30 minutes was impracticable is thoroughly documented.

Visual examinations must be conducted during daylight hours in a well-lit area to accurately observe and document the results.

### **3.3.2 Visual Examination Parameters**

Grab samples will be collected in a clear glass jar at each monitoring point on a quarterly basis. The contents of the jar shall be observed and documented for the nine visual examination parameters which are discussed below:

1. Color
2. Odor
3. Clarity
4. Floating solids
5. Settled solids
6. Suspended solids
7. Foam
8. Oily sheen
9. Other indicators of possible storm water pollution

Color – Water that is colorless lacks pollutants that affect water color. Water that is slightly milky or light brown in color usually indicates the presence of suspended sediment. Suspended sediment will impart the same color to water as the surrounding soil (e.g., the Red Rock area of Sedona may have red storm water runoff). The presence of a color that is different from the surrounding soil color may indicate the presence of a chemical pollutant.

Odor – Most water is either odorless or has a slight “earthy” odor. Odors such as gasoline fumes, solvents, sulfur or rotten eggs, sewage, or a sour smell may be indicative of chemical pollutants.

Clarity – Clarity refers to the amount of suspended material present that causes the water to be opaque and limits the amount of light that can pass through the water. The cloudier the water is, the more likely it is to contain suspended material.

Floating solids – Solids may float if they are buoyant in water. Observe the surface of the grab sample for floating solids and describe them.

Settled solids – Solids may settle to the bottom if they are heavier than water. Observe the bottom of the grab sample for settled solids and describe them.

Suspended solids – Solids may remain in suspension if they have the same buoyancy as water or if their physical shape allows them to remain in suspension for long periods of time. Observe the entire water column of the grab sample for suspended solids and describe them.

Foam – The presence of foam on the water surface may indicate the presence of industrial foaming agents or surfactants.

Oily sheen – An oily sheen is present if a film of iridescent color is observed on the water surface. Look for a rainbow effect that can appear to be floating on the surface of the water. Usually an oily sheen indicates the presence of oil or grease. On rare occasions, and usually in the fall, an oily sheen can be the result of the decomposition of fallen leaves.

Other indicators of possible storm water pollution – Document any other phenomena that do not fall under any of the other categories.

### **3.3.3 Visual Examination Documentation**

Visual examination documentation is required by the MSGP-2000. The following information will be recorded on a Visual Examination Report (VER), which may be found in Appendix B:

- Facility name
- Date and time of examination
- Monitoring personnel
- Monitoring point location (complete one VER per monitoring point as listed in the Sign Factory SWPPP)
- Nature of discharge (rainfall or snowmelt)
- Time that the rainfall event began
- Duration of the rainfall event
- Inches of rainfall from the rainfall event
- Length of time since the last qualifying rainfall event as described in section 2.2.1
- Description of the nine visual examination parameters

Entries on the VER should be made with waterproof ink. If an error is made, cross it out rather than whiting out or erasing.

### **3.3.4 Interpreting Visual Examination Results**

Results of visual examinations should be used by ADOT monitoring personnel to identify any problems that need to be addressed, such as oil or grease in the storm water discharge. The ADOT monitoring personnel should also document any changes made to the SWPPP as a result of visual examinations.

## **3.4 Analytical Monitoring**

### **3.4.1 Analytical Monitoring Schedule**

Analytical monitoring must be performed on a quarterly basis in years two and four of the permit (2006 and 2008 for ADOT facilities). At the Sign Factory, analytical monitoring must be performed once during each of the following quarters:

1. October through December
2. January through March
3. April through June
4. July through September

Analytical monitoring will be performed on discharges resulting from a qualifying rainfall event (an event that produces 0.1 inch or more in measured rainfall; causes runoff to be present at the outfall; and occurs at least 72 hours from the previous 0.1-inch rainfall). Analytical monitoring may be performed at the same time as visual examinations.

Analytical monitoring samples must be taken in the first 30 minutes of the discharge produced by a qualifying rainfall event. If the collection of a grab sample during the first 30 minutes is impracticable, a sample can be taken during the first hour of the discharge, as long as an explanation of why a grab sample during the first 30 minutes was impracticable is thoroughly documented.

If, as a result of averaging the results of the four quarterly samples collected in year two (2006), the average pollutant discharge concentration is below the benchmark levels found in Table 3, the Sign Factory may waive year four's (2008).

### 3.4.2 Analytical Monitoring Parameters

Table 3 lists the specific parameters that will be monitored at the Sign Factory.

**Table 3. Analytical Monitoring Parameters and Benchmark Levels for the ADOT Traffic Operations Sign Factory**

Parameter	Method	Reporting Limit	Maximum Holding Time	EPA Industrial Storm Water Benchmark Level
Aluminum, T*	EPA 200.7	0.20 mg/L	6 months	0.75 mg/L
Iron, T*	EPA 200.7	0.5 mg/L	6 months	1.0 mg/L
NO <sub>2</sub> + NO <sub>3</sub>	EPA 300.0	0.1 mg/L	48 hours	0.68 mg/L
Zinc, T*	EPA 200.7	0.02 mg/L	6 months	0.117 mg/L

\* T = total recoverable

### 3.4.3 Analytical Monitoring Documentation

Analytical Monitoring documentation is required by the MSGP-2000. The following information will be recorded on an Analytical Monitoring Report (AMR), which may be found in Appendix C:

- Facility name
- Date and time of sample collection
- Monitoring personnel
- Monitoring point location (complete one AMR per monitoring point as listed in the Sign Factory SWPPP)
- Nature of discharge (rainfall or snowmelt)
- Time that the rainfall event began
- Duration of the rainfall event
- Inches of rainfall from the rainfall event
- Length of time since the last qualifying rainfall event as described in section 2.2.1
- Description of sample collection method (i.e., grab sample from ditch, lowered bottle down manhole)

- Description of the samples collected (i.e., list of parameters, duplicates, splits)
- Unusual circumstances that may affect sample results

Entries on the AMR should be made with waterproof ink. If an error is made, cross it out rather than whiting out or erasing.

### 3.4.4 Interpreting the Analytical Monitoring Results

If, as a result of averaging the results of the four quarterly samples collected in year two (2006), the average pollutant discharge concentration is below the benchmark levels found in Table 3, the Sign Factory may waive year four's analytical monitoring requirements. However if, as a result of averaging the results of the four quarterly samples collected in year two (2006), the average pollutant discharge concentration is higher than the benchmark levels found in Table 3, the Sign Factory must continue to perform analytical monitoring in year four (2008) and must also review and revise the SWPPP to reduce the concentration of pollutants in the storm water discharges. Year four's analytical monitoring results may then be used as an indicator of the effectiveness of the revision to the SWPPP. If year four's analytical monitoring results are still above the benchmark levels found in Table 3, the SWPPP must be reviewed and revised once again by ADOT in an attempt to further reduce pollutant loads.

The formula for calculating an average is as follows:

$$\text{Average} = \frac{\text{Results from Quarter 1} + \text{Results from Quarter 2} + \text{Results from Quarter 3} + \text{Results from Quarter 4}}{\text{Number of Quarters Sampled}}$$

## **4.0 ADOT MATERIAL SOURCE MINING SITES – SECTOR J**

### **4.1 Non-Storm Water Discharge Characterization**

#### **4.1.1 Initial Non-Storm Water Discharge Characterization Certification Schedule**

Although the MSGP-2000 provides for the allowance of some non-storm water discharges, non-storm water discharges to waters of the United States which are not authorized by a permit are unlawful, and must be terminated. Each ADOT Material Source Mining Site must evaluate and characterize any non-storm water discharge at its facility. Whenever an unauthorized non-storm water discharge is observed, the discharge must be contained, characterized, and managed in accordance with all federal, state, and local requirements. The discharge must be prevented from occurring in the future, and details of the non-storm water discharge must be documented in the facility's SWPPP.

Non-storm water discharge characterization evaluations must initially be performed within 180 days of filing an NOI to discharge under the MSGP-2000 and documented in the SWPPP. Non-storm water discharge characterization evaluations may be performed at any time of the year. A copy of the initial certification will be included in the facility's SWPPP and kept onsite.

#### **4.1.2 Non-Storm Water Discharge Characterization Evaluation Methods**

Non-storm water discharge characterization evaluations may be performed by utilizing these methods:

- Visual observation for discharges during periods of dry weather
- Visual observation for discharges originating from non-storm water sources such as pipes, drains, tanks, buildings, equipment, etc.
- Visual observation for unusual staining along drainage paths
- Visual observation of storm water runoff for the presence of abnormal color, solid, foam, or oily sheen
- Observation of unusual odors in storm water runoff

Once a potential non-storm water discharge has been identified, the following actions can be used to help identify the source:

- Physically trace the non-storm water discharge back to its source
- Utilize smoke or dye testing to locate the source of the non-storm water discharge in pipes
- Review storm sewer, sanitary sewer, plumbing schematics, and facility as-built plans
- Collect non-storm water discharge samples for laboratory analysis if the nature of the non-storm water discharge cannot be determined otherwise

#### **4.1.3 Non-Storm Water Discharge Characterization Documentation**

The following information shall be recorded on a Non-Storm Water Discharge Certification form (Appendix A):

- Facility name
- Date of testing or evaluation

- Name of person who conducted testing or evaluation
- Identification of potential significant sources of non-storm water on site
- List of outfalls observed during testing or evaluation
- Description of testing methods or evaluation criteria
- Description of results of any testing or evaluation of discharge

Entries on the Non-Storm Water Discharge Certification form should be made with waterproof ink. If an error is made, cross it out rather than whiting out or erasing.

If certification of non-storm water discharges cannot be made within 180 days after submitting an NOI, ADOT must submit to ADEQ notification of failure to certify. If the failure to certify is caused by the inability of ADOT to perform adequate tests or evaluations, the notification must include:

- Reason(s) why certification was not possible
- The procedure of any test attempted
- The results of such test or other relevant observations
- Potential sources of non-storm water discharges to the storm sewer

## **4.2 Monitoring Point Locations**

Four types of ADOT Material Source Mining Sites have been selected to serve as representative sites for monitoring due to the numbers of Material Source Mining Sites in the state. Therefore, visual examination and analytical monitoring will be conducted at one ADOT Material Source Mining Site that is representative of each of the following four types of ADOT Material Source Mining Sites:

- Cinder pit material source mining site (SIC Code 1429)
- Stone quarry material source mining site (SIC Codes 1422 and 1429)
- Sand and gravel material source mining site (SIC Code 1442)
- Borrow pit material source mining site (SIC Code 1499)

Compliance monitoring for dewatering activities will be conducted only at material source mining sites with SIC Codes of 1422-1442, and 1446 as required by the MSGP-2000. Borrow pit material source mining sites with an SIC Code of 1499 are not subject to compliance monitoring for dewatering activities. Stockpile sites are not subject to monitoring under the MSGP-2000 and have not been included in this manual. Although monitoring is not required, stockpile sites are subject to BMPs under the *ADOT Statewide Storm Water Management Plan*.

All storm water outfalls at each ADOT Material Source Mining Site are identified in the facility's SWPPP. Monitoring points will be located at selected ADOT Material Source Mining Site outfalls (as previously described in section 2.2.3, Representative Discharge, if the ADOT Material Source Mining Site has two or more outfalls that discharge substantially identical effluents, a single visual examination and analytical monitoring sample from one of the outfalls is sufficient as long as the collected monitoring data is representative of all outfalls).

It is important that the selected monitoring points will provide samples that contain only the storm water that comes from the ADOT Material Source Mining Site. If the storm water discharge to be sampled contains discharges from other sources, move the monitoring point upstream to a point where

the discharge is entirely from the ADOT Material Source Mining Site. Also, verify that there is no base flow during dry periods. The SWPPP should identify the presence of any base flow and provide a specific measurement or an estimate of the flow rate. If it is not possible to collect a sample that contains discharge only from the ADOT Material Source Mining Site, document the reason for this and provide detailed information concerning the source(s) of the discharge that is being sampled.

Potential Monitoring Points may include:

- Pipes discharging the ADOT Material Source Mining Site storm water offsite
- Ditches carrying the ADOT Material Source Mining Site storm water offsite
- Manhole access points to storm sewers carrying the ADOT Material Source Mining Site storm water, so a sample bottle attached to a pole can be lowered into the manhole (Manhole access on ADOT property may be simpler and safer than manhole access off ADOT property and will be more readily verifiable as carrying only the ADOT Material Source Mining Site storm water)

These three types of monitoring points are not too difficult to access and the discharge within them tends to be fast enough, with enough turbulence, to allow for the collection of well mixed, representative samples.

Examples of situations in which you *should not* sample:

- A ditch that carries additional storm-water from adjacent or upstream properties. In this case, the storm water from the ADOT Material Source Mining Site is mixed with other water. Find a location or locations where the ADOT Material Source Mining Site storm water alone can be sampled.
- Shallow sheet flow which is more difficult to sample. Find a location where the flow is deeper and can accommodate a sample bottle.
- A storm water sewer or pipe (culvert) discharges to a creek or other surface receiving water, and the pipe is partially submerged where it discharges into the receiving water. In this case, this final discharge point will not be able to be used as a monitoring point because the storm water discharge is mixed with the surface receiving water. Keep in mind that changing flow conditions in surface receiving waters, including flood stages, may occur during storm events.
- A manhole that carries storm water, not only from the ADOT Material Source Mining Site but also from other storm water sources as well. If collecting a sample from a manhole but from the point where a storm sewer from the ADOT Material Source Mining Site ends at a municipal manhole, make sure that the discharge in that pipe is entirely from the ADOT Material Source Mining Site, that the pipe is not submerged or partly submerged, and that collecting storm water from the ADOT Material Source Mining Site only is otherwise not prevented. If unsure that a storm sewer carries only discharge from the ADOT Material Source Mining Site, the municipality may have storm sewer plans to help make this determination. Contact the municipality beforehand to discuss sampling from the manhole and associated safety issues, particularly for manholes in areas with vehicular traffic.

It is a good idea to observe the monitoring point(s) that have been chosen at the ADOT Material Source Mining Sites during actual storm water runoff conditions to see how readily storm water can be sampled.

## **4.3 Visual Examinations**

### **4.3.1 Visual Examination Schedule**

The schedule for performing visual examinations must be clearly documented in the ADOT Material Source Mining Site's SWPPP. Visual examinations are required to be performed on a quarterly basis throughout the period of permit coverage. At the ADOT Material Source Mining Site, at least one visual examination must be performed during each of the following quarters:

1. October through December
2. January through March
3. April through June
4. July through September

Visual examinations will be conducted on discharges resulting from a qualifying rainfall event (an event that produces 0.1 inch or more in measured rainfall; causes runoff to be present at the outfall; and occurs at least 72 hours from the previous 0.1-inch rainfall).

Grab samples for visual examination must be taken in the first 30 minutes of the discharge produced by a qualifying rainfall event. If the collection of a grab sample during the first 30 minutes is impracticable, a grab sample can be taken during the first hour of the discharge, as long as an explanation of why a grab sample during the first 30 minutes was impracticable is thoroughly documented.

Visual examinations must be conducted during daylight hours in a well-lit area to accurately observe and document the results.

### **4.3.2 Visual Examination Parameters**

Grab samples will be collected in a clear glass jar at each monitoring point on a quarterly basis. The contents of the jar shall be observed and documented for the nine visual examination parameters which are discussed below:

1. Color
2. Odor
3. Clarity
4. Floating solids
5. Settled solids
6. Suspended solids
7. Foam
8. Oily sheen
9. Other indicators of possible storm water pollution

Color – Water that is colorless lacks pollutants that affect water color. Water that is slightly milky or light brown in color usually indicates the presence of suspended sediment. Suspended sediment will impart the same color to water as the surrounding soil (e.g., the Red Rock area of Sedona may have red storm water runoff). The presence of a color that is different from the surrounding soil color may indicate the presence of a chemical pollutant.

Odor – Most water is either odorless or has a slight “earthy” odor. Odors such as gasoline fumes, solvents, sulfur or rotten eggs, sewage, or a sour smell may be indicative of chemical pollutants.

Clarity – Clarity refers to the amount of suspended material present that causes the water to be opaque and limits the amount of light that can pass through the water. The cloudier the water is, the more likely it is to contain suspended material.

Floating solids – Solids may float if they are buoyant in water. Observe the surface of the grab sample for floating solids and describe them.

Settled solids – Solids may settle to the bottom if they are heavier than water. Observe the bottom of the grab sample for settled solids and describe them.

Suspended solids – Solids may remain in suspension if they have the same buoyancy as water or if their physical shape allows them to remain in suspension for long periods of time. Observe the entire water column of the grab sample for suspended solids and describe them.

Foam – The presence of foam on the water surface may indicate the presence of industrial foaming agents or surfactants.

Oily sheen – An oily sheen is present if a film of iridescent color is observed on the water surface. Look for a rainbow effect that can appear to be floating on the surface of the water. Usually an oily sheen indicates the presence of oil or grease. On rare occasions, and usually in the fall, an oily sheen can be the result of the decomposition of fallen leaves.

Other indicators of possible storm water pollution – Document any other phenomena that do not fall under any of the other categories.

#### **4.3.3 Visual Examination Documentation**

Visual examination documentation is required by the MSGP-2000. The following information will be recorded on a VER, which may be found in Appendix B:

- Material Source Mining Site name and location
- Date and time of examination
- Monitoring personnel
- Monitoring point location (complete one VER per monitoring point as listed in the ADOT Material Source Mining Site SWPPP)
- Nature of discharge (rainfall or snowmelt)
- Time that the rainfall event began
- Duration of the rainfall event
- Inches of rainfall from the rainfall event
- Length of time since the last qualifying rainfall event as described in section 2.2.1
- Description of the nine visual examination parameters

Entries on the VER should be made with waterproof ink. If an error is made, cross it out rather than whiting out or erasing.

#### **4.3.4 Interpreting Visual Examination Results**

Results of visual examinations should be used by ADOT monitoring personnel to identify any problems that need to be addressed, such as oil or grease in the storm water discharge. The ADOT monitoring personnel should also document any changes made to the SWPPP as a result of visual examinations.

### **4.4 Analytical Monitoring for Benchmark Parameters**

#### **4.4.1 Analytical Monitoring Schedule**

Analytical monitoring, also referred to as benchmark monitoring, requires laboratory analysis of storm water samples, and must be performed on a quarterly basis in years two and four of the permit (2006 and 2008 for ADOT facilities). At the selected ADOT Material Source Mining Sites, analytical monitoring must be performed once during each of the following quarters:

1. October through December
2. January through March
3. April through June
4. July through September

Analytical monitoring will be performed on discharges resulting from a qualifying rainfall event (an event that produces 0.1 inch or more in measured rainfall; causes runoff to be present at the outfall; and occurs at least 72 hours from the previous 0.1-inch rainfall). Analytical monitoring may be performed at the same time as visual examinations.

Analytical monitoring samples must be taken in the first 30 minutes of the discharge produced by a qualifying rainfall event. If the collection of a grab sample during the first 30 minutes is impracticable, a sample can be taken during the first hour of the discharge, as long as an explanation of why a grab sample during the first 30 minutes was impracticable is thoroughly documented.

If, as a result of averaging the results of the four quarterly samples collected in year two (2006), the average pollutant discharge concentration is below the benchmark levels found in Table 4 for cinder pits and Table 5 for sand and gravel pits, the ADOT Material Source Mining Site may waive year four's (2008) analytical monitoring requirements.

#### **4.4.2 Analytical Monitoring Parameters**

Table 4 lists the specific parameters that will be monitored at the selected ADOT-owned and operated cinder pit, stone quarry, and borrow pit. Table 5 lists the specific parameters that will be monitored at the selected ADOT-owned and operated sand and gravel material source mining site.

**Table 4. Analytical Monitoring Parameters and Benchmark Level for ADOT-Owned and Operated Cinder Pit, Stone Quarry, and Borrow Pit Material Source Mining Sites**

Parameter	Method	Reporting Limit	Maximum Holding Time	EPA Industrial Storm Water Benchmark Level
TSS	EPA 160.2	1.0 mg/L	7 days	100 mg/L

**Table 5. Analytical Monitoring Parameters and Benchmark Levels for ADOT-Owned and Operated Sand and Gravel Material Source Mining Sites**

Parameter	Method	Reporting Limit	Maximum Holding Time	EPA Industrial Storm Water Benchmark Level
NO <sub>2</sub> + NO <sub>3</sub>	EPA 300.0	0.1 mg/L	48 hours	0.68 mg/L
TSS	EPA 160.2	1.0 mg/L	7 days	100 mg/L

#### 4.4.3 Analytical Monitoring Documentation

Analytical monitoring documentation is required by the MSGP-2000. The following information will be recorded on an AMR, which may be found in Appendix C:

- Material Source Mining Site and location
- Date and time of sample collection
- Monitoring personnel
- Monitoring point location (complete one AMR per monitoring point as listed in the ADOT Material Source Mining Site SWPPP)
- Nature of discharge (rainfall or snowmelt)
- Time that the rainfall event began
- Duration of the rainfall event
- Inches of rainfall from the rainfall event
- Length of time since the last qualifying rainfall event as described in section 2.2.1
- Description of sample collection method (i.e., grab sample from ditch, lowered bottle down manhole)
- Description of the samples collected (i.e., list of parameters, duplicates, splits)
- Unusual circumstances that may affect sample results

Entries on the AMR should be made with waterproof ink. If an error is made, cross it out rather than whiting out or erasing.

#### 4.4.4 Interpreting the Analytical Monitoring Results

If, as a result of averaging the results of the four quarterly samples collected in year two (2006), the average pollutant discharge concentration is below the respective benchmark levels found in Tables 4 and 5, the ADOT Material Source Mining Site may waive year four's analytical monitoring requirements. However if, as a result of averaging the results of the four quarterly samples collected in year two (2006), the average pollutant discharge concentration is higher than the benchmark levels

found in Tables 4 and 5, the ADOT Material Source Mining Site must continue to perform analytical monitoring in year four (2008) and must also review and revise the SWPPP to reduce the concentration of pollutants in the storm water discharges. Year four's analytical monitoring results may then be used as an indicator of the effectiveness of the revision to the SWPPP. If year four's analytical monitoring results are still above the benchmark levels found in Tables 4 and 5, the SWPPP must be reviewed and revised once again by ADOT in an attempt to further reduce pollutant loads.

The formula for calculating an average is as follows:

$$\text{Average} = \frac{\text{Results from Quarter 1} + \text{Results from Quarter 2} + \text{Results from Quarter 3} + \text{Results from Quarter 4}}{\text{Number of Quarters Sampled}}$$

## 4.5 Compliance Monitoring for Mine Dewatering Activities

### 4.5.1 Compliance Monitoring Schedule

Mine dewatering discharges composed entirely of storm water or ground water seepage from construction sand and gravel, industrial sand, and crushed stone mining facilities in Arizona are regulated under the MSGP-2000. This includes ADOT cinder pit, stone quarry, and sand and gravel material source mining sites.

EPA defines “mine dewatering” as “any water that is impounded or that collects in the mine and is pumped, drained or otherwise removed from the mine through the efforts of the mine operator. This term shall also include wet pit overflows caused solely by direct rainfall and ground water seepage. However, if a mine is also used for treatment of process generated waste water, discharges of commingled water from the facilities shall be deemed discharges of process generated waste water.”

At each discharging ADOT cinder pit, stone quarry, and sand and gravel material source mining site, compliance monitoring for mine dewatering activities must be performed once during each of the permit years if mine dewatering occurs. **Note: Compliance monitoring must be reported to ADEQ no later than the 28<sup>th</sup> of the month following the monitoring period (see Section 10.4).**

### 4.5.2 Compliance Monitoring Parameters

Table 6 lists the specific parameters that will be monitored once per year for a mine dewatering activity at each discharging ADOT cinder pit, stone quarry, and sand and gravel material source mining site. Compliance monitoring data may be used to meet the quarterly analytical monitoring requirements for the specified parameters, where compatible.

**Table 6. Compliance Monitoring Parameters and Numeric Effluent Limitations for Dewatering Activities Conducted by ADOT-Owned and Operated Cinder Pit, Stone Quarry, and Sand and Gravel Material Source Mining Sites**

Parameter	Method	Reporting Limit	Maximum Holding Time	EPA Numeric Effluent Limitations*
pH	EPA 150.1	N/A	Immediately	6.0 – 9.0 s.u.**
TSS	EPA 160.2	1.0 mg/L	7 days	25 mg/L monthly average; 45 mg/L daily maximum

\* Effluent limitations are from 40 CFR part 436 Subpart C

\*\* s.u. = standard pH units

Wet pit overflows from discharging ADOT cinder pit, stone quarry, and sand and gravel material source mining sites are not subject to the compliance monitoring requirements described in this section *if* the facility is designed, constructed, and maintained to contain or treat the volume of waste water which would result from a 10-year 24-hour precipitation event (a civil engineer or hydrologist can determine if an ADOT sand and gravel material source mining site meets this design criteria).

#### 4.5.3 Compliance Monitoring Documentation

Compliance monitoring documentation is required by the MSGP-2000. The following information will be recorded on a Discharge Monitoring Report (DMR), which may be found in Appendix F:

- Material Source Mining Site and location
- Date and time of sample collection
- Monitoring personnel
- Monitoring point location (complete one DMR per monitoring point as listed in the ADOT Material Source Mining Site SWPPP)
- Nature of discharge (rainfall or snowmelt)
- Time that the rainfall event began
- Duration of the rainfall event
- Inches of rainfall from the rainfall event
- Length of time since the last qualifying rainfall event as described in section 2.2.1
- Description of sample collection method (i.e., grab sample from ditch, lowered bottle down manhole)
- Description of the samples collected (i.e., list of parameters, duplicates, splits)
- Mine dewatering or wet pit overflow information
- Unusual circumstances that may affect sample results

Entries on the DMR should be made with waterproof ink. If an error is made, cross it out rather than whiting out or erasing.

#### 4.5.4 Interpreting the Compliance Monitoring Results

If the pollutant discharge concentration at the ADOT cinder pit, stone quarry, and sand and gravel material mining site exceeds the respective effluent limitation(s) found in Table 6, the facility is out of

compliance with the MSGP-2000. When the compliance monitoring results are reported to ADEQ on the DMR, this exceedance(s) is noted at the bottom of the form (under “No. of Exceedances”). The SWPPP should be reviewed and revised by ADOT in an attempt to reduce pollutant loads to a level that will not cause future exceedances of the effluent limitation(s).

If the pollutant discharge concentration at the ADOT cinder, pit, stone quarry, or sand and gravel material mining site does not exceed the respective effluent limitation(s) found in Table 6, the facility is in compliance with the MSGP-2000 and the SWPPP is performing adequately.

## **5.0 GRAND CANYON AIRPORT – SECTOR S**

### **5.1 Non-Storm Water Discharge Characterization**

#### **5.1.1 Non-Storm Water Discharge Characterization Certification Schedule**

Non-storm water discharge characterization certification is a one-time event to evaluate non-storm water discharges from the Grand Canyon Airport (herein referred to as the Airport). Non-storm water discharge characterization certifications need to be performed only once for each outfall as described in the Airport SWPPP.

Non-storm water discharge characterization evaluations must initially be performed within 180 days of filing an NOI to discharge under the MSGP-2000 and documented in the SWPPP. Non-storm water discharge characterization evaluations may be performed at any time of the year. A copy of the initial certification will be included in the facility's SWPPP and kept onsite.

#### **5.1.2 Non-Storm Water Discharge Characterization Evaluation Methods**

Non-storm water discharge characterization evaluations may be performed by utilizing these methods:

- Visual observation for discharges during periods of dry weather
- Visual observation for discharges originating from non-storm water sources such as pipes, drains, tanks, buildings, equipment, etc.
- Visual observation for unusual staining along drainage paths
- Visual observation of storm water runoff for the presence of abnormal color, solid, foam, or oily sheen
- Observation of unusual odors in storm water runoff

Once a potential non-storm water discharge has been identified, the following actions can be used to help identify the source:

- Physically trace the non-storm water discharge back to its source
- Utilize smoke or dye testing to locate the source of the non-storm water discharge in pipes
- Review storm sewer, sanitary sewer, plumbing schematics, and facility as-built plans
- Collect non-storm water discharge samples for laboratory analysis if the nature of the non-storm water discharge cannot be determined otherwise

#### **5.1.3 Non-Storm Water Discharge Characterization Documentation**

The following information shall be recorded on a Non-Storm Water Discharge Certification form (Appendix A):

- Facility name
- Date of testing or evaluation
- Name of person who conducted testing or evaluation
- Identification of potential significant sources of non-storm water on site
- List of outfalls observed during testing or evaluation

- Description of testing methods or evaluation criteria
- Description of results of any testing or evaluation of discharge

Entries on the Non-Storm Water Discharge Certification form should be made with waterproof ink. If an error is made, cross it out rather than whiting out or erasing.

If certification of non-storm water discharges cannot be made within 180 days after submitting an NOI, ADOT must submit to ADEQ notification of failure to certify. If the failure to certify is caused by the inability of ADOT to perform adequate tests or evaluations, the notification must include:

- Reason(s) why certification was not possible
- The procedure of any test attempted
- The results of such test or other relevant observations
- Potential sources of non-storm water discharges to the storm sewer

## **5.2 Monitoring Point Locations**

All storm water outfalls at the Airport are identified in the facility's SWPPP. Monitoring points will be located at selected Airport outfalls. (As previously described in Section 2.2.3 Representative Discharge, if the Airport has two or more outfalls that discharge substantially identical effluents, a single visual examination and analytical monitoring sample from one of the outfalls is sufficient as long as the collected monitoring data is representative of both outfalls.)

It is important that the selected monitoring points will provide samples that contain only the storm water that comes from the Airport. If the storm water discharge to be sampled contains discharges from other sources, move the monitoring point upstream to a point where the discharge is wholly from the Airport. Also, verify that there is no base flow during dry periods. The SWPPP should identify the presence of any base flow and provide a specific measurement or an estimate of the flow rate. If it is not possible to collect a sample that contains discharge only from the Airport, document the reason for this and provide detailed information concerning the source(s) of the discharge that is being sampled.

Potential Monitoring Points may include:

- Pipes discharging Airport storm water offsite
- Ditches carrying Airport storm water offsite
- Manhole access points to storm sewers carrying Airport storm water, so a sample bottle attached to a pole can be lowered into the manhole (Manhole access on ADOT property may be simpler and safer than manhole access off ADOT property and will be more readily verifiable as carrying only the Airport storm water)

These three types of monitoring points are not too difficult to access and the discharge within them tends to be fast enough, with enough turbulence, to allow for the collection of well mixed, representative samples.

Examples of situations in which you *should not* sample:

- A ditch that carries additional storm-water from properties upstream. In this case, the storm water from the Airport is mixed with other water. Find a location or locations where the Airport storm water alone can be sampled.
- Shallow sheet flow which is more difficult to sample. Find a location where the flow is deeper and can accommodate a sample bottle.
- A storm water sewer or pipe (culvert) discharges to a creek or other surface receiving water, and the pipe is partially submerged where it discharges into the receiving water. In this case, this final discharge point will not be able to be used as a monitoring point because the storm water discharge is mixed with the surface receiving water. Keep in mind that changing flow conditions in surface receiving waters, including flood stages, may occur during storm events.
- A manhole that carries storm water, not only from the Airport but also from other storm water sources as well. If collecting a sample from a manhole but from the point where a storm sewer from the Airport ends at a municipal manhole, make sure that the discharge in that pipe is entirely from the Airport, that the pipe is not submerged or partly submerged, and that collecting storm water from the Airport only is otherwise not prevented. If unsure that a storm sewer carries only discharge from the Airport, review the storm sewer plans to help make this determination.

It is a good idea to observe the monitoring point(s) that have been chosen at the Airport during actual storm water runoff conditions to see how readily storm water can be sampled.

## **5.3 Visual Examinations**

### **5.3.1 Visual Examination Schedule**

The schedule for performing visual examinations must be clearly documented in the Airport's SWPPP. Visual examinations are required to be performed on a quarterly basis throughout the period of permit coverage. At the Airport, at least one visual examination must be performed during each of the following quarters:

1. October through December
2. January through March
3. April through June
4. July through September

Visual examinations will be conducted on discharges resulting from a qualifying rainfall event (an event that produces 0.1 inch or more in measured rainfall; causes runoff to be present at the outfall; and occurs at least 72 hours from the previous 0.1-inch rainfall).

Grab samples for visual examination must be taken in the first 30 minutes of the discharge produced by a qualifying rainfall event. If the collection of a grab sample during the first 30 minutes is impracticable, a grab sample can be taken during the first hour of the discharge, as long as an explanation of why a grab sample during the first 30 minutes was impracticable is thoroughly documented.

Visual examinations must be conducted during daylight hours in a well-lit area to accurately observe and document the results.

### **5.3.2 Visual Examination Parameters**

Grab samples will be collected in a clear glass jar at each monitoring point on a quarterly basis. The contents of the jar shall be observed and documented for the nine visual examination parameters which are discussed below:

1. Color
2. Odor
3. Clarity
4. Floating solids
5. Settled solids
6. Suspended solids
7. Foam
8. Oily sheen
9. Other indicators of possible storm water pollution

Color – Water that is colorless lacks pollutants that affect water color. Water that is slightly milky or light brown in color usually indicates the presence of suspended sediment. Suspended sediment will impart the same color to water as the surrounding soil (e.g., the Red Rock area of Sedona may have red storm water runoff). The presence of a color that is different from the surrounding soil color may indicate the presence of a chemical pollutant.

Odor – Most water is either odorless or has a slight “earthy” odor. Odors such as gasoline fumes, solvents, sulfur or rotten eggs, sewage, or a sour smell may be indicative of chemical pollutants.

Clarity – Clarity refers to the amount of suspended material present that causes the water to be opaque and limits the amount of light that can pass through the water. The cloudier the water is, the more likely it is to contain suspended material.

Floating solids – Solids may float if they are buoyant in water. Observe the surface of the grab sample for floating solids and describe them.

Settled solids – Solids may settle to the bottom if they are heavier than water. Observe the bottom of the grab sample for settled solids and describe them.

Suspended solids – Solids may remain in suspension if they have the same buoyancy as water or if their physical shape allows them to remain in suspension for long periods of time. Observe the entire water column of the grab sample for suspended solids and describe them.

Foam – The presence of foam on the water surface may indicate the presence of industrial foaming agents or surfactants.

Oily sheen – An oily sheen is present if a film of iridescent color is observed on the water surface. Look for a rainbow effect that can appear to be floating on the surface of the water. Usually an oily

sheen indicates the presence of oil or grease. On rare occasions, and usually in the fall, an oily sheen can be the result of the decomposition of fallen leaves.

Other indicators of possible storm water pollution – Document any other phenomena that do not fall under any of the other categories.

### **5.3.3 Visual Examination Documentation**

Visual examination documentation is required by the MSGP-2000. The following information will be recorded on a VER, which may be found in Appendix B:

- Facility name
- Date and time of examination
- Monitoring personnel
- Monitoring point location (complete one VER per monitoring point as listed in the Airport SWPPP)
- Nature of discharge (rainfall or snowmelt)
- Time that the rainfall event began
- Duration of the rainfall event
- Inches of rainfall from the rainfall event
- Length of time since the last qualifying rainfall event as described in section 2.2.1
- Description of the nine visual examination parameters

Entries on the VER should be made with waterproof ink. If an error is made, cross it out rather than whiting out or erasing.

### **5.3.4 Interpreting Visual Examination Results**

Results of visual examinations should be used by ADOT monitoring personnel to identify any problems that need to be addressed, such as oil or grease in the storm water discharge. The ADOT monitoring personnel should also document any changes made to the SWPPP as a result of visual examinations.

## **5.4 Analytical Monitoring**

Per the MSGP-2000, the Airport does not exceed the annual usage threshold limitations for glycol-based de-icing/anti-icing chemicals and/or urea and therefore, does not have any analytical monitoring requirements (see Table 2).

## **6.0 LABORATORY SELECTION**

Important considerations when selecting an analytical laboratory include location, performance, ability to meet analytical reporting limits (RLs), also known as quantitation limits (QLs), and experience with the types of samples that will be collected by ADOT.

An Arizona Department of Health Services (ADHS) certification is required for laboratories analyzing ADOT monitoring samples. It is absolutely crucial to data quality to select an analytical laboratory that is licensed, accredited, and certified by ADHS. ADHS-licensed laboratories are held to stringent standards to ensure the data they produce are accurate and precise. However, there may be certain cases where it may be difficult to contract for all required analyses with ADHS-certified laboratories. In such cases, alternative arrangements may be made provided that the exception is documented and approved by the ADOT task order manager. For example, if parameter RLs cannot be adequately achieved by ADHS-licensed laboratories, a research level laboratory with a proven ability to perform the needed analyses can be used with approval from the ADOT task order manager. Such laboratories may include out-of-state commercial laboratories or university/research laboratories with demonstrated expertise in USEPA-sponsored research or method development programs.

### **6.1 Laboratory Quality Assurance and Quality Control**

Analytical data can be of little value if a laboratory does not have a strong Quality Assurance and Quality Control (QA/QC) program. All laboratory procedures must be documented in writing as either Standard Operating Procedures (SOPs) or Method Procedures. Internal quality control procedures for analytical services must be conducted by the laboratory in accordance with SOPs and the individual method requirements in a manner consistent with appropriate SW-846, 40 CFR Part 136, or ADHS-approved analytical methods. The laboratory will reanalyze any samples found to be in non-conformance with the QC criteria if sufficient sample volume is available (it is expected that sufficient volume of samples will be left over after initial analysis). Compliance with the QA/QC program must be coordinated and monitored by the laboratory's Quality Assurance Manager who is independent of the operating departments.

In order to be certified by ADHS, an analytical laboratory is required to have a Quality Assurance Plan (QAP) or Quality Assurance Manual that contains a set of QA/QC procedures that cover all aspects of laboratory operations. The contracted laboratory will provide a copy of its QAP upon request.

### **6.2 Reporting Limit Requirements**

Sample analyses will be conducted according to the test procedures approved within 40 CFR 136. For some parameters, alternative analytical methodologies may be used to meet the data quality objectives for RLs and quality control limits. Also, methods are constantly being updated and new methods may be developed for different analytical parameters. In selecting the analytical method to be used, the following questions should be addressed:

- Does the method conform to any legal or regulatory requirements for the monitoring program?
- Does the method allow the required reporting limits to be easily obtained on storm water samples?

- Does the method have the same or more stringent quality control limits than a comparable method?
- Will the data provided by the method be comparable to historical data collected at the monitoring point?
- Is the method recognized as “standard” so that the data collected at a monitoring point can be compared to other monitoring points?
- Is the laboratory proficient with the method? Do they have historical data to show proficiency?

The recommended analytical methods for MSGP-2000 parameters are shown in Table 7 (found in Section 7.3). All of these methods are described either in *Standard Methods for the Examination of Water and Wastewater, 20<sup>th</sup> Edition* or in the listed USEPA method. The listed methods may be consulted for more detailed analytical information.

### **6.3 Laboratory Data Package Deliverables**

As a part of the laboratory contract, the data package that will be delivered to ADOT and the timing of its delivery (turn around time) should be defined. Common turn around times for laboratory data packages are two to three weeks for faxed data and three weeks to thirty days for hard copy and electronic copy. Receiving the faxed data quickly allows an early data review to identify any problems that may be corrected through re-extraction or re-analysis of leftover sample that is still at the laboratory. Unless notified to do otherwise, the laboratory only keeps leftover samples for 30 days. The data package should be delivered in hard copy and electronic copy (on diskette or CD).

The hard copy data package should include a narrative that outlines any problems, corrections, anomalies, and conclusions, as well as completed chain of custody documentation. A summary of the following QA/QC elements must be in the data package (see Tables 8 and 9 in Section 8 of this manual):

- Sample extraction and analysis dates
- Results of method blanks
- Summary of analytical accuracy (matrix spike and duplicate compound recoveries and lab control samples)
- Summary of analytical precision (comparison of laboratory control samples, matrix duplicate and matrix spike duplicate results)
- Reporting limits

## **7.0 SAMPLE COLLECTION, TREATMENT, AND HANDLING**

To minimize the chance of sample contamination and unreliable analytical results, special measures must be taken during the collection, treatment, and handling of samples prior to analysis. For example, samples must be collected properly, stored in the appropriate containers, and preserved immediately. Samples must be analyzed within established holding times to ensure reliability of the results. Chain-of-custody procedures must be followed for sample handling and transportation to the laboratory. Each of these measures is discussed in more detail below.

### **7.1 Sampling Equipment**

It is important to assemble everything that will be needed for the monitoring event ahead of time because opportunities to sample during rainfall events often come with little advanced notice. Storm water monitoring requires the following equipment:

- Field forms (VER, AMR)
- Waterproof pens
- Permanent markers
- Powder-free nitrile gloves
- Clear glass jar for visual examinations
- Sample containers
- Sample preservatives
- Sample container labels
- Chain-of-custody forms
- Chain-of-custody seals
- Ice chests
- Ice
- Foul-weather gear
- Manhole sampler (if necessary)

### **7.2 Sample Collection Protocols**

Water quality sampling shall employ “clean” sampling techniques to minimize potential sources of sample contamination – particularly from trace pollutants. Experience has shown that when clean sampling techniques are used, detected concentrations of constituents tend to be lower. Clean sample collection techniques that should be followed during the collection of water samples are described below. Care must be taken during sampling to minimize exposure of the samples to human, atmospheric, and other potential sources of contamination. Care must also be taken to avoid contamination whenever handling containers and lids. To reduce potential contamination, monitoring personnel must adhere to the following rules while collecting water samples:

- Do not eat, drink, or smoke during sample collection.
- Never sample near a running vehicle.
- Do not park vehicles in the immediate sample collection area (even non-running vehicles).
- Always wear clean, powder-free nitrile gloves when handling sample containers and lids.
- Never touch the inside surface of a sample container or lid, even with gloved hands.

- Never allow the inner surface of a sample container or lid to be contacted by any material other than the sample water.
- Do not overfill sample containers (preservative may be lost).
- Never allow any object or material to fall into or contact the collected sample water.
- Avoid allowing rainwater to drip from rain gear or other surfaces into sample containers.
- Replace and tighten sample container lids immediately after sample collection.

Monitoring points that are located in ditches, swales, or channels should be approached from downstream whenever possible to minimize any bottom disturbance that could influence water quality. Be careful that the flow is not concentrated to the point the bottom starts to erode and increases the amount of sediment in the water. Samples will be collected while facing upstream. When filling a sample bottle, lower the bottle slowly into the water to avoid disturbing the bottom and stirring up sediment.

Storm water samples will be collected manually using the manual grab sample technique.

#### Manual Grab Sample Technique

A manual grab sample will define water quality at a distinct point in time. These samples are easily collected and are favored when the anticipated water quality of the discharge is homogeneous, or unchanging, in nature.

A manual grab sample is an individual sample of at least 100 milliliters usually collected by direct submersion of each individual sample bottle into the water to be sampled. To collect samples, the water depth will need to be at least 1 centimeter or 0.5 inch. Filling a sample bottle is difficult when the water is shallow and the bottles cannot be completely submerged. Thus, an intermediate container should be used. For example, one clean, unpreserved sample bottle can be designated as the intermediate container and used to collect multiple grab samples to fill the remaining sample bottles. Fill the bottles as full as possible without overfilling.

### **7.3 Sample Preservation**

Chemical preservatives are added to the samples for certain analyses to prolong the stability of the parameters during transport and storage. Table 7 lists the required sample preservatives for the analytical parameters. Monitoring personnel should add the appropriate preservative to each sample container immediately after collection. All samples must be iced immediately after collection.

### **7.4 Holding Times**

Maximum acceptable holding times are specified for each analytical method in Table 7. The holding time starts when sample collection is complete and is counted until extraction/preparation or analysis of the sample at the laboratory. If a sample is not analyzed within the designated holding time, the analytical results may be suspect. Thus, it is important that the monitoring personnel meet all specified holding times and the laboratory make every effort to prepare and analyze the samples as soon as possible after they are received. Prompt analysis also allows the laboratory time to review the data and, if analytical problems are found, re-analyze the affected samples.

**Table 7. Sample Container Requirements**

Parameter	Method	Reporting Limit (mg/L)	Container Volume and Type**	Preservative	Maximum Holding Time (shaded = short holding time)
Aluminum, T*	EPA 200.7	0.20	500-ml P	Nitric acid (HNO <sub>3</sub> )	6 months
Iron, T	EPA 200.7	0.5	500-ml P	Nitric acid (HNO <sub>3</sub> )	6 months
NO <sub>2</sub> + NO <sub>3</sub>	EPA 300.0	0.1	500-ml P or G	Cool to 4°C	48 hours
pH	EPA 150.1	N/A	1-Liter P	None	Immediately
TSS	EPA 160.2	1.0	1-Liter P or G	Cool to 4°C	7 days
Zinc, T	EPA 200.7	0.02	500-ml P	Nitric acid (HNO <sub>3</sub> )	6 months

\* T = total recoverable

\*\* P = plastic; G = glass; VOA = volatile organic aromatic vial

Some holding times for parameters are short and will require the laboratory to analyze the sample promptly after receipt. For example, NO<sub>2</sub> + NO<sub>3</sub> analyses must be performed within 48 hours after sample collection. pH needs to be measured in the field with a pH meter. Holding times may be a factor affecting allowable sampling times if the laboratory has not agreed to work evenings or weekends. To minimize the risk of exceeding the holding times, storm water samples must be transferred to the analytical laboratory as soon as possible after sampling is complete. Moreover, the laboratory should be notified before the sampling begins so that it can prepare to analyze the samples immediately upon receipt.

## 7.5 Chain of Custody Requirements

Chain-of-custody (COC) forms are provided by the laboratory. They are to be filled out by monitoring personnel for all samples submitted to the analytical laboratory. The purpose of COC forms is to keep a record of the sample submittal information and to document the transfer of sample custody. Sample date, sample location, and the analyses requested are noted on the COC form. Any special instructions for the laboratory should also be noted on the COC form such as specifications of quality control requirements (e.g., duplicate samples). The COC form must be signed by both the person relinquishing the samples and the person receiving the samples every time the samples change hands, thus documenting the chain of custody.

Custody seals are used to detect unauthorized tampering with the samples. The seals are printed on strips of adhesive-backed paper. They are affixed over the lid of a filled sample container in such a way that the sample container cannot be opened without breaking the seal. Custody seals must be completed and affixed to all sample containers before the samples leave the custody of the monitoring personnel.

Appendix D contains an example of a laboratory COC form.

## 8.0 QUALITY ASSURANCE AND QUALITY CONTROL

The QA/QC program must ensure that the samples collected are of the highest quality and that the laboratory analyzing the samples is producing reliable results. The same QA/QC procedures will be followed for all ADOT monitoring points.

### 8.1 Field QA/QC Procedures

Field QA/QC procedures include aspects of preparedness, monitoring personnel consistency, and field QC samples.

#### Preparedness

Sampling equipment, sample containers, and forms must be available and prepared for each monitoring point prior to a monitoring event. By preparing for an event ahead of time, the possibility of filling incorrect or mislabeled containers can be avoided. All equipment must be cleaned and prepared for the next monitoring event upon return from the previous monitoring event.

#### Monitoring Personnel Consistency

Visual examinations are highly subjective. Two monitoring personnel may offer a contrasting set of results for the same visual examination. Therefore, under the MSGP-2000, the same individual should perform the collection and visual examination of discharges for the entire permit term (2005-2010).

#### Field QC Samples

Two types of field QC samples are collected: duplicates and splits. Table 8 (in Section 8.2 below) lists the acceptable limits for sample duplicate precision.

**DUPLICATES** - Samples are taken as a single sample and split into two separate, but identical samples. Both samples are sent to the same laboratory; one of the sample's identity is disguised to keep the lab from knowingly making the results match. The collection frequency of this sample is 10% or one in ten samples. The two samples' results are compared to determine the sample duplicate precision, which is a measure of laboratory precision and accuracy. Sample duplicate precision is calculated using the following formula and is expressed as relative percent difference (RPD):

$$\begin{array}{l} \text{Sample} \\ \text{Duplicate} \\ \text{Precision} \\ \text{(RPD)} \end{array} = \frac{\text{Results from Duplicate A} - \text{Results from Duplicate B}}{\text{Duplicate A}} \times 100$$

**SPLITS** - Samples are taken as a single sample and split into two separate, but identical samples. The samples are labeled identically but are sent to different laboratories. The frequency of this sample will be once per monitoring year. The two samples' results are compared to determine sample duplicate precision, which is a measure of laboratory precision and accuracy. Sample duplicate precision is calculated using the following formula and is expressed as RPD:

$$\frac{\text{Sample Duplicate Precision (RPD)}}{= \frac{\text{Results from Split A} - \text{Results from Split B}}{\text{Split A}}} \times 100$$

## 8.2 Laboratory Quality Control Requirements

Cleanliness of the sampling equipment is vital to ensuring that contamination is not introduced from a controllable factor. Sample containers must be certified clean by the laboratory to minimize sample contamination. Clean techniques must be used when handling the sample and when performing analyses.

In order to be certified by ADHS, an analytical laboratory is required to have a documented quality assurance program that covers all aspects of laboratory operations.

Tables 8 and 9 list the minimum laboratory QC requirements required for ADOT monitoring.

**Table 8. Acceptable Limits for Field and Laboratory Sample Duplicate Precision**

Parameter	Sample Duplicate Precision
Aluminum, T*	<35% RPD
Iron, T*	<35% RPD
NO <sub>2</sub> + NO <sub>3</sub>	<15% RPD
pH	<15% RPD
TSS	<15% RPD
Zinc, T*	<35% RPD

\* T = total recoverable

**Table 9. Minimum Laboratory QC Requirements**

Sample Type	Frequency	Purpose
Method Blank	5% of instrument batch*	Check for contamination
Matrix Spike	5% of instrument batch	Measure accuracy
Matrix Duplicate	5% of instrument batch	Monitor precision and reproducibility
Matrix Spike Duplicate	5% of instrument batch	Measure accuracy & precision
Lab Control Sample	5% of instrument batch	Measure method accuracy
Lab Control Duplicate	5% of instrument batch	Measure method accuracy & precision
Proficiency Samples	Annually	Prove proficiency w/in study area
Double Blind Samples	Annually	Assess laboratory operations

\* Instrument batch here is defined as a set of 10 analytical samples run in succession

### **8.3 Data Review and Validation**

Data review and validation uses all of the sampling data received for a monitoring event. All reports from the contract laboratory are reviewed upon receipt. Checks of the holding times, proper chain of custody procedures, preservation, sample data, QC sample data, and lab QC data are made to determine the validity of the data. Data review and validation will be conducted for each sample by the monitoring personnel who collected the samples. A Data Validation Sheet (Appendix E) is completed and attached to each sample data set. Any circumstance in which the data do not meet the criteria on the review sheet, or data that seem questionable, will be immediately reported to the laboratory for resolution.

## 9.0 DATA MANAGEMENT

Storm water monitoring data may be stored in electronic and/or paper files. The data files shall be readily accessible for review, assessment, and reporting purposes. To facilitate data management, analysis, and the comparison of results, ADOT has developed a standard system for managing storm water information. To keep sampling data organized, all data must be clearly labeled with the monitoring point information.

### 9.1 Data Types

There are two primary types of data collected in the storm water monitoring program: field records and laboratory water quality data.

#### Field Records

Field records contain field measurement results and physical observations that are recorded during a monitoring event. The formats used for field records vary somewhat, depending upon the type of monitoring, and are summarized below:

**Table 10. ADOT Monitoring Forms**

Type of Monitoring	Appropriate Form	Location of Form
Non-Storm Water Discharge Characterization	Non-Storm Water Discharge Certification form	Appendix A
Visual Examinations	Visual Examination Report form (VER)	Appendix B
Analytical Monitoring	Analytical Monitoring Report form (AMR)	Appendix C
Compliance Monitoring	Discharge Monitoring Report form (DMR)	Appendix F

#### Laboratory Water Quality Data

The laboratory water quality data are a direct result of the samples collected during a monitoring event. The laboratory reports data in both a paper report and an electronic format. In addition to sample results, the laboratory may also include detailed information on internal laboratory quality assurance and quality control.

Laboratory water quality data include information such as:

- Laboratory reports
- Chain-of-custody forms
- Quality assurance reports
- Data validation sheets
- Corrective action reports

## **9.2 Data Retrieval and Storage**

Field records and analytical water quality data are managed electronically in ADOT's Storm Water Information Management System (SWIMS), which has been created within ADOT's Information Technology system. SWIMS is continually updated as information is collected.

## **9.3 Records Retention**

ADOT shall retain copies of all monitoring data and Discharge Monitoring Reports for a period of three years from the date of the samples. ADEQ may extend the retention period at any time.

## **10.0 REPORTING REQUIREMENTS**

### **10.1 Non-Storm Water Discharge Characterization Reporting Requirements**

Non-storm water discharge certifications are kept on site with the SWPPP (see Appendix A).

### **10.2 Visual Examination Reporting Requirements**

A facility is not required to submit visual examination results unless requested to do so by ADEQ. However, results from all visual examinations should be documented with the facility's SWPPP.

### **10.3 Analytical Monitoring Reporting Requirements**

Analytical Monitoring Reports (AMRs) are saved and all results are submitted on a DMR for the monitoring year in one package by January 28 of the following year. A separate DMR is completed for each monitoring point that has been identified in the monitoring plan. Appendix F contains a blank DMR form that may be photocopied. A copy of the completed DMR is also kept on site with the SWPPP.

DMRs shall be submitted to ADEQ at the following address:

Storm Water DMR Coordinator  
Arizona Department of Environmental Quality  
1110 W. Washington Street, Mail Code 5415 B-1  
Phoenix, AZ 85007

Note: If the regulated facility discharges to a Municipal Separate Storm Sewer System (MS4), signed copies of the DMR must also be submitted to the operator of the MS4.

### **10.4 Compliance Monitoring Reporting Requirements**

Compliance monitoring results for mine dewatering discharges are submitted to ADEQ by the 28<sup>th</sup> day of the month following the monitoring period. Compliance monitoring results are also submitted on the DMR form (Appendix F).

DMRs shall be submitted to ADEQ at the following address:

Storm Water DMR Coordinator  
Arizona Department of Environmental Quality  
1110 W. Washington Street, Mail Code 5415 B-1  
Phoenix, AZ 85007

## **10.5 Reporting Non-Compliance to ADEQ**

ADOT shall report to ADEQ any noncompliance which may endanger human health or the environment. ADOT shall orally notify the office listed below within 24 hours:

Arizona Department of Environmental Quality  
1110 W. Washington, 5th floor (5555)  
Phoenix, AZ 85007  
Office: 602-771-4841; Fax 602-771-4505

A written submission shall also be provided to the office identified above within five days of the time ADOT becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

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## 12.0 GLOSSARY

**10-year 24-hour precipitation event** – The maximum 24-hour precipitation event with a probable reoccurrence interval of once in 10 years. This information is available in *Weather Bureau Technical Paper No. 40*, May 1961 and *NOAA Atlas 2*, 1973 for the 11 Western States, and may be obtained from the National Climatic Center of the Environmental Data Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce.

**ADEQ** – Arizona Department of Environmental Quality

**ADHS** – Arizona Department of Health Services

**ADOT** – Arizona Department of Transportation

**AZMSGP** – Arizona Multi-Sector General Permit

**Base flow** – Normal day-to-day flow that is usually present in a drainage feature.

**BMPs** – Best Management Practices; permit conditions used in place of or in conjunction with effluent limitations to prevent or control the discharge of pollutants. May include schedule of activities, prohibition of practices, maintenance procedure, or other management practice. BMPs may include, but are not limited to, treatment requirements, operating procedures, or practices to control plant site runoff, spillage, leaks, sludge or waste disposal, or drainage from raw material storage.

**COC** – Chain of custody

**Construction sand and gravel mine** – An area of land, surface or underground, actively mined for the production of sand and gravel from natural deposits.

**Construction sand and gravel mine dewatering** – Any water that is impounded or that collects in the mine and is pumped, drained or otherwise removed from the mine through the efforts of the mine operator. This term shall also include wet pit overflows caused solely by direct rainfall and ground water seepage. However, if a mine is also used for treatment of process generated waste water, discharges of commingled water from the facilities shall be deemed discharges of process generated waste water.

**Discharge** – Any release, spill, leak, pump, flow, escape, dumping, or disposal of any liquid, semisolid or solid substance. Also means any addition of any pollutant to waters of the United States from any point source (A.R.S. 49-255(2)).

**DMR** – Discharge Monitoring Report

**Downstream** – In the direction of the current of a stream.

**Effluent** – Storm water originating from a facility outfall.

**Holding time** – The maximum amount

**Mg** – Milligram; equal to 0.001 gram of time a sample may be stored before analysis.

**L** – Liter; equal to 1000 milliliters.

**Mg/L** – Milligram per liter; roughly equivalent to a part per million.

**ml** – Milliliter; equal to 0.001 liter.

**Monitoring** – Refers to a variety of activities and processes through which ADOT will obtain information relevant to its implementation of the storm water quality management program so that the need for and/or opportunities for revising or refining its program can be identified.

**MSGP-2000** – Multi-Sector General Permit

**NO<sub>2</sub> + NO<sub>3</sub>** – Nitrite plus nitrate

**NOI** – Notice of Intent

**NPDES** – National Pollutant Discharge Elimination System

**Operator** – The owner or operator of any facility or activity subject to regulation under the NPDES program.

**Outfall** – Discharge or point of discharge of a culvert or other closed conduit.

**Parameter** – A variable, measurable property whose value is a determinant of the characteristics of a system; e.g. temperature, pH, and turbidity are parameters of water.

**pH** – Analytical measurement of the acidic, neutral, or basic properties of a water sample which is determined by the amount of hydrogen ion activity present.

**Pollutant** – Fluids, contaminants, toxic wastes, toxic pollutants, dredged spoil, solid waste, substances and chemicals, pesticides, herbicides, fertilizers and other agricultural chemicals, incinerator residue, sewage, garbage, sewage sludge, munitions, petroleum products, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and mining, industrial, municipal and agricultural wastes or any other liquid, solid, gaseous or hazardous substances (A.R.S. 49-201(28)).

**Quantitative** – Refers to a value that is number driven.

**QL** – Quantitation limit; the minimum amount of a substance that can be quantitatively measured with a specified degree of confidence and within the accuracy and precision guidelines of a specific measurement system.

**Process generated waste water** – Any waste water used in the slurry transport of mined material, air emissions control, or processing exclusive of mining. The term shall also include any other water which becomes commingled with such waste water in a pit, pond, lagoon, mine or other facility used for treatment of such waste water. The term does not include waste water used for the suction dredging of deposits in a body of water and returned directly to the body of waste without being used for other purposes or combined with other waste water.

**QA/QC** – Quality assurance and quality control; a system of procedures, checks, audits, and corrective actions to ensure that all environmental monitoring and sampling, and other technical and reporting activities, are of the highest achievable quality.

**QAP** – Quality assurance plan

**Quality control** – Individual procedures, checks, audits, and corrective actions taken to ensure that all environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality.

**RL** – Reporting Limit; the level to which data is reported for a specific test method and/or sample.

**RPD** – Relative percent difference

**Sample** – A small amount of water collected from a larger portion intended to show the nature and quality of the rest.

**Sampling** – The act of collecting samples.

**Sediment** – Organic or inorganic material that is carried by or is suspended in water and that settles out to form deposits in the storm drain system or receiving waters.

**SOPs** – Standard operating procedures

**Surface receiving water** – A surface water that has a storm water discharge flowing into it.

**Surface water** – Also known as are “waters of the United States”, which include:

- All waters which are, have been, or could be used for interstate or foreign commerce
- All interstate waters or wetlands
- All lakes, reservoirs, natural ponds, rivers, streams (including intermittent and ephemeral streams), creeks, washes, draws, mudflats, sandflats, wetlands, backwaters, playas (etc.) which could be used by visitors to our state for recreation, from which fish or shellfish could be taken or sold, or which is used for industrial purposes

- All impoundments, wetlands, or tributaries of above waters (Summarized from Arizona Administrative Code R18-11-101)

**SWPPP** – Storm Water Pollution Prevention Plan

**Total recoverable** – The concentration of metals determined on an unfiltered sample after vigorous digestion, or the sum of the concentrations of metals in both dissolved and suspended fractions.

**TSS** – Total suspended solids

**Upstream** – Toward the source or upper part of a stream; against the current.

**USEPA** – United States Environmental Protection Agency

**Water column** – The area of a surface water that lies between the bottom of the jar and the water surface.

# **Appendix A**

## **Non-Storm Water Discharge Certification Form**



# Non-Storm Water Discharge Certification

(Test or evaluate each outfall identified in the facility SWPPP)

MSGP Permit Number:

Facility Name:			Facility Address:		
Date of Testing or Evaluation:	Outfall Identification (Identify on Site Map):	Description of Testing Method(s) or Evaluation Criteria	Results from Testing or Evaluation or Reason(s) for Not Performing the Testing or Evaluation	Identification of Potential Significant Sources of Non-Storm Water Discharges On Site	Name of Person Who Conducted the Testing or Evaluation:
<b>CERTIFICATION STATEMENT</b>					
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.					
Printed Name of Principal Executive Officer:				Title:	
Signature of Principal Executive Officer:				Date:	

# **Appendix B**

## **Visual Examination Report Form**



# Quarterly Visual Examination Report

(Complete a separate form for each monitoring point)

<b>Facility Name:</b>		<b>Monitoring Point:</b>
<b>Quarter and Year:</b>	<b>Date &amp; Time Collected:</b>	<b>Date &amp; Time Examined:</b>
<b>Time Rainfall Began:</b>	<b>Duration of Rainfall Event:</b>	<b>Rainfall Amount (inches):</b>
<b>Runoff Source:</b> Rainfall or Snowmelt	<b>Time Elapsed Since Last 0.1 inch Rainfall Event:</b>	<b>Qualifying Rainfall Event:</b> YES or NO
<b>Monitoring Personnel Name(s):</b>		
<b>PARAMETER</b>	<b>PARAMETER DESCRIPTION</b>	<b>PARAMETER CHARACTERISTICS</b>
<b>1. Color</b>	Does the sample appear to be colored? <b>YES NO</b>	<b>Describe:</b>
<b>2. Odor</b>	Does the sample have an odor? <b>YES NO</b>	<b>Describe:</b>
<b>3. Clarity</b>	Is the sample clear or transparent, meaning you can see through it? <b>YES NO</b>	Which of the following best describes the clarity? <b>Clear Milky Opaque</b> Other (describe):
<b>4. Floating Solids</b>	Is there something floating on the surface of the sample? <b>YES NO</b>	<b>Describe:</b>
<b>5. Settled Solids</b>	Is there something settled at the bottom of the sample? <b>YES NO</b>	<b>Describe:</b>
<b>6. Suspended Solids</b>	Is there something suspended in the water column of the sample? <b>YES NO</b>	<b>Describe:</b>
<b>7. Foam</b>	Is there foam or material forming on the top of the sample? <b>YES NO</b>	<b>Describe:</b>
<b>8. Oily Sheen</b>	Can you see a rainbow effect or sheen on the water surface? <b>YES NO</b>	Which of the following best describes the sheen? <b>Oily Silver Iridescent</b> Other (describe):
Detail any concerns, corrective actions taken, and any other obvious indicators of pollution present in the sample:		
<b>Signature of Monitoring Personnel:</b>		

# **Appendix C**

## **Analytical Monitoring Report Form**



# Quarterly Analytical Monitoring Report

(Complete a separate form for each monitoring point)

<b>Facility Name:</b>		<b>Monitoring Point:</b>	
<b>Quarter and Year:</b>	<b>Date Collected:</b>	<b>Monitoring Personnel Name(s):</b>	
<b>Time Rainfall Began:</b>	<b>Duration of Rainfall Event:</b>	<b>Rainfall Amount (inches):</b>	
<b>Runoff Source:</b> Rainfall or Snowmelt	<b>Time Elapsed Since Last 0.1 inch Rainfall Event:</b>	<b>Qualifying Rainfall Event:</b> YES or NO	
<b>Estimated Total Volume of Discharge (Include units; gal, ft<sup>3</sup>, etc.):</b>			
PARAMETER	SAMPLE TIME	HOW WAS SAMPLE COLLECTED?	QC SAMPLES
1.			Duplicate Split
2.			Duplicate Split
3.			Duplicate Split
4.			Duplicate Split
5.			Duplicate Split
Remarks, calculations, mine dewatering information, unusual circumstances that may affect sample results, additional information:			
Signature of Monitoring Personnel:			

# **Appendix D**

## **Chain of Custody Form**



# **Appendix E**

## **Data Validation Sheet**



# Data Validation Sheet

Facility Name: \_\_\_\_\_ Monitoring Point: \_\_\_\_\_

Sample Date/Time: \_\_\_\_\_ Sample Type: *Grab Duplicate Split*

Analytical Laboratory: \_\_\_\_\_

*(Use the information contained in Table 9 from the guidance manual to check all sample results)*

All Samples		YES (√)	NO (√)	REMARKS
	Did the laboratory analyze all parameters requested on the chain of custody form?			
	Were the samples analyzed using the methods specified in the monitoring plan?			
	Were all holding times met by both the monitoring personnel and the laboratory?			
	Were the reported values at or below the reporting limits specified in the monitoring plan?			

*(Use the information contained in Table 10 from the guidance manual to check the QC sample results)*

QC Samples		YES (√)	NO (√)	REMARKS
	For duplicate samples: Does sample duplicate precision meet the specified criteria?			
	For split samples: Does sample duplicate precision meet the criteria specified in the monitoring plan?			
	----- If not, did the laboratories use the same analytical methods?			

# **Appendix F**

## **Discharge Monitoring Report Form**



ARIZONA DEPARTMENT OF TRANSPORTATION Page \_\_\_\_ of \_\_\_\_  
Monthly Discharge Monitoring Report (DMR) Form  
for the NPDES Multi-Sector General Permit

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)  
NAME

ADDRESS

FACILITY  
LOCATION

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)  
DISCHARGE MONITORING REPORT (DMR)

(2-16)	(17-19)
PERMIT NUMBER	DISCHARGE NUMBER

Form Approved.  
OMB No. 2040-0004  
Approval expires 05-31-98

MONITORING PERIOD

FROM	YEAR	MO	DAY	TO	YEAR	MO	DAY
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

☐ Check here if No Discharge

NOTE: Read Instructions before completing this form

PARAMETER (32-37)		(3 Card Only) QUANTITY OR LOADING (46-53)			(4 Card Only) QUALITY OR CONCENTRATION (38-45) (46-53) (54-61)				NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
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	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION. THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.	TELEPHONE		DATE		
		AREA CODE	NUMBER	YEAR	MO	DAY
TYPED OR PRINTED	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT					

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

# **Appendix G**

## **EPA Industrial Storm Water Benchmark Parameter Information**

### EPA Industrial Storm Water Benchmark Parameters and Levels

Parameter	Method	Reporting Limit (mg/L)	Maximum Holding Time	EPA Industrial Storm water Benchmark Level (mg/L unless otherwise noted)
Aluminum, T*	EPA 200.7	0.20	6 months	0.75
Ammonia	EPA 350.2	1.0	28 days	19.0
Arsenic, T	EPA 200.9	0.005	6 months	0.16854
BOD <sub>5</sub>	EPA 405.1	2.0	48 hours	30
Cadmium, T	EPA 200.7	0.005	6 months	0.0159
COD	EPA 410.1	20.0	28 days	120.0
Copper, T	EPA 200.7	0.015	6 months	0.0636
Cyanide, Total	EPA 335.2	0.01	14 days	0.0636
Iron, T	EPA 200.7	0.5	6 months	1.0
Lead, T	EPA 200.9	0.005	6 months	0.0816
Magnesium, T	EPA 200.7	0.06	6 months	0.0636
Mercury, T	EPA 245.1	0.002	28 days	0.0024
NO <sub>2</sub> + NO <sub>3</sub>	EPA 300.0	0.1	48 hours	0.68
TKN	EPA 351.4	0.5	28 days	1.5
Oil & Grease	EPA 413.1	10	28 days	15
pH	EPA 150.1	N/A	Immed.	6.0 to 9.0 s.u.**
Phosphorous	EPA 365.2	0.05	28 days	2.0
Selenium, T	EPA 200.7	0.20	6 months	0.2385
Silver, T	EPA 200.7	0.04	6 months	0.03818
TOC	SM 5310 C	0.2	28 days	50
TSS	EPA 160.2	1.0	7 days	100
Zinc, T	EPA 200.7	0.02	6 months	0.117

\* T = total recoverable

\*\* s.u. = standard pH units

## Sample Container Requirements for EPA Industrial Storm Water Benchmark Parameters

Parameter	Method	Reporting Limit (mg/L)	Container Volume and Type**	Preservative	Maximum Holding Time (shaded = short holding time)
Aluminum, T*	EPA 200.7	0.20	500-ml P	Nitric acid (HNO <sub>3</sub> )	6 months
Ammonia	EPA 350.2	1.0	500 ml P	Sulfuric acid (H <sub>2</sub> SO <sub>4</sub> ), Cool to 4° C	28 days
Arsenic, T	EPA 200.9	0.005	500-ml P	Nitric acid (HNO <sub>3</sub> )	6 months
BOD <sub>5</sub>	EPA 405.1	2.0	1-Liter P	Cool to 4° C	48 hours
Cadmium, T	EPA 200.7	0.005	500-ml P	Nitric acid (HNO <sub>3</sub> )	6 months
COD	EPA 410.1	20.0	500 ml P	Sulfuric acid (H <sub>2</sub> SO <sub>4</sub> ), Cool to 4° C	28 days
Copper, T	EPA 200.7	0.015	500-ml P	Nitric acid (HNO <sub>3</sub> )	6 months
Cyanide, Total	EPA 335.2	0.01	1-Liter P	Sodium hydroxide NaOH), Cool to 4° C, Keep in dark	14 days
Iron, T	EPA 200.7	0.5	500-ml P	Nitric acid (HNO <sub>3</sub> )	6 months
Lead, T	EPA 200.9	0.005	500-ml P	Nitric acid (HNO <sub>3</sub> )	6 months
Magnesium, T	EPA 200.7	0.06	500-ml P	Nitric acid (HNO <sub>3</sub> )	6 months
Mercury, T	EPA 245.1	0.002	500-ml P	Nitric acid (HNO <sub>3</sub> )	28 days
NO <sub>2</sub> + NO <sub>3</sub>	EPA 300.0	0.1	500-ml P or G	Cool to 4° C	48 hours
TKN	EPA 351.4	0.5	500 ml P	Sulfuric acid (H <sub>2</sub> SO <sub>4</sub> ), Cool to 4° C	28 days
Oil & Grease	EPA 413.1	10	1-Liter G wide mouth jar	Hydrochloric acid (HCl), Cool to 4° C	28 days
pH	EPA 150.1	N/A	1-Liter P	None	Immediately
Phosphorous	EPA 365.2	0.05	500-ml P or G	Sulfuric acid (H <sub>2</sub> SO <sub>4</sub> ), Cool to 4° C	28 days
Selenium, T	EPA 200.7	0.20	500-ml P	Nitric acid (HNO <sub>3</sub> )	6 months
Silver, T	EPA 200.7	0.04	500-ml P	Nitric acid (HNO <sub>3</sub> )	6 months
TOC	SM 5310 C	0.2	1-Liter G VOA	Sulfuric acid (H <sub>2</sub> SO <sub>4</sub> ), Cool to 4° C	28 days
TSS	EPA 160.2	1.0	1-Liter P or G	Cool to 4° C	7 days
Zinc, T	EPA 200.7	0.02	500-ml P	Nitric acid (HNO <sub>3</sub> )	6 months

\* T = total recoverable

\*\* P = plastic; G = glass; VOA = volatile organic aromatic vial

## Acceptable Limits for Sample Duplicate Precision for EPA Industrial Storm Water Benchmark Parameters

Parameter	Sample Duplicate Precision
Aluminum, T*	<35% RPD
Ammonia	<15% RPD
Arsenic, T	<35% RPD
BOD <sub>5</sub>	<30% RPD
Cadmium, T	<35% RPD
COD	<30% RPD
Copper, T	<35% RPD
Cyanide, Total	<30% RPD
Iron, T	<35% RPD
Lead, T	<35% RPD
Magnesium, T	<35% RPD
Mercury, T	<35% RPD
NO <sub>2</sub> + NO <sub>3</sub>	<15% RPD
TKN	<15% RPD
Oil & Grease	<15% RPD
pH	<15% RPD
Phosphorous	<15% RPD
Selenium, T	<35% RPD
Silver, T	<35% RPD
TOC	<15% RPD
TSS	<15% RPD
Zinc, T	<35% RPD

\* T = total recoverable